Contest Corner: The 2013 State Tournament of Mathematics Results

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Abstract: *The authors summarize results from the 2013 Ohio Council of Teachers of Mathematics (OCTM) Annual Contest. Sample problems from the contest are provided along with scores from top teams in Ohio.*

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1 Introduction

The OCTMs 2013 State Tournament of Mathematics took place on February 23rd at test centers throughout Ohio. Now is the time to start assembling a team to represent your school in the 2014 competition. The 2014 tournament will take place on February 22, 2014, at test centers located throughout Ohio. You can find registration information on the OCTM State Tournament of Mathematics at `http://www.octmtournament.org`.

2 Statewide Results

The overall results from the 2013 State Tournament of Mathematics are summarized in Table 1.

Table 1: *2013 Overall State Tournament of Mathematics Results.*

Rank	School	Score	Rank	School	Score
1	William Mason HS	144	10 (tie)	Revere HS	104
2	Dublin Jerome HS	141	12	Lakota West HS	102
3	Columbus Academy	119	12 (tie)	Thomas Worthington HS	102
4	Sycamore HS	112	14	Beavercreek HS	101
5	Upper Arlington HS	111	15	Athens HS	99
6	Solon HS	110	15 (tie)	Hathaway Brown HS	99
7	Copley HS	109	17	Dublin Coffman HS	97
8	Western Reserve Academy	106	18	Perrysburg HS	94
9	Seven Hills Upper School	105	19	Miami Valley HS	93
10	Brecksville-Broadview Heights HS	104	19 (tie)	St Xavier HS	93

The OCTM also presents awards and recognition to participating schools by their size. In this way, small schools are not put in direct competition with larger schools. OCTM uses a five level system

to group schools. Level 1 schools have fewer than 95 students per grade level, Level 2 schools have between 95 and 164 students per grade level, Level 3 schools have between 165 and 249 students per grade level, Level 4 schools have between 250 and 358 students per grade level and Level 5 schools have more than 358 students per grade level. Table 2 shows the 2013 tournament results for levels 1-3. Table 3 presents the same results for schools at levels 4 and 5.

Table 2: *2013 State Tournament Results for Levels 1-3.*

Level 1 ($n \leq 94$)	Level 2 ($94 < n \leq 164$)	Level 3 ($164 < n \leq 249$)
119 Columbus	106 Western Reserve	104 Revere
105 Seven Hills Upper	80 Hawken Upper	99 Athens
99 Hathaway Brown	67 Cincinnati Hills Christian	87 Bellbrook
93 Miami Valley	66 Cuyahoga Valley Christian	82 Carroll
65 New Bremen	62 Huron	79 St Vincent-St Mary
63 Delaware Christian	60 Central Catholic	73 Archbishop Hoban
62 Bluffton	58 Kirtland	66 Shawnee
61 Cincinnati Country Day	56 Coldwater	63 Perkins
58 Cardington-Lincoln	55 Chippewa	61 John Hay
57 Russia	55 Edison	59 Celina
55 Granville Christian HS	53 Madison-Plains	59 Lexington
53 Holgate	52 Highland	52 Napoleon
52 Fort Jennings	52 Roger Bacon	47 Padua Franciscan
51 Worthington Christian	46 Brookville	40 Canton South
49 Ayersville	46 North Union	40 Shelby
		40 Tri-Valley

Table 3: *2013 State Tournament Results for Levels 4-5.*

Level 4 ($249 < n \leq 358$)	Level 5 ($358 < n$)
119 Columbus	144 William Mason
109 Copley	112 Sycamore
94 Perrysburg	111 Upper Arlington
83 Mayfield	110 Solon
82 Ashland	104 Brecksville-Broadview Heights
79 Aurora	102 Lakota West
78 Olmsted Falls	102 Thomas Worthington
77 Lake	101 Beavercreek
69 Anthony Wayne	97 Dublin Coffman
69 Kings	93 St Xavier
69 Norwalk	89 Centerville
63 Avon Lake	88 Walnut Hills
58 Rutherford B. Hayes	68 Grove City
55 Loveland	68 Hilliard Darby
55 Olentangy Orange	68 Perry
	66 Marion L Steele

3 Sample Problems

Seven problems selected from the 40 that appeared on the 2013 tournament are shown in Fig 1. All of the problems can be solved using algebra, geometry, and arithmetic and calculators are certainly allowed.

Table 4: *A sampling from the 40 problems that appeared on the 2013 contest.*

TASKS	ANSWERS
Determine the value of $2 \cdot 0^{13} + 2^0 \cdot 13$.	13
The equation of the perpendicular bisector of $\overline{AB}$ is of the form $y = px + q$. Given $A(2, 23)$ and $B(20, 13)$, find the value of $p + q$.	0
The roots of $x^2 - 108x + c = 0$ are $x = r$ and $x = s$. If $20r + 13s = 2013$, find the value of c.	1827
Playing my favorite video game, I have lost 13 of my first 20 games. How many consecutive games must I win in order to 6 raise my winning percentage to exactly 50%?	6
Suppose $\sqrt[4]{\sqrt[3]{\sqrt{x}}} = \sqrt[b]{x^a}$ is expressed in simplest form. Find the value of $a + b$.	11
The sum of the digits in 2013, meaning $2 + 0 + 1 + 3$, is divisible by 6. What is the *next year* that the sum of the digits is also divisible by 6?	2019
Cathy Fischer bought ten copies of her favorite math book: one to keep for herself and the rest to give as gifts for her friends. The books were on sale at 10% off the original price. After paying a sales tax of 6% and then a wrapping charge of 50 cents each for the gifts, she spent a total of $\$176.22$. What was the original price of one book?	$\$18$

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